1:Beals E-5 (1940-1941)1946 NU34 Tarasco NU34

clear honey is desired, it may be strained through silk. The native wild combs contain no wax. The larvae are sometimes eaten, either toasted in their cells or fried. The latter method of preparation involves picking the larvae out of the cells. Yet another method is to toast the larvae with onion, chile, and salt. The latter method is said to be especially tasty, but probably only *panaleros* ever use any of these methods very often.[5]

The larvae of another insect, the *traspanal* (*jicotera* in La Cañada), are also collected and eaten occasionally. This insect resembles the native bee but is a little larger and makes its nest in the ground to depths of 1 meter (3 ft.) or more. No other animal food is collected and the use of the eggs of wild birds was denied with every evidence of distaste.

USE OF MINERALS

Stone, volcanic cinders, and clay are the three mineral resources utilized in Cherán. Tuffs and lavas are employed for house building, foundations, and fences. The materials occur either in the town itself or in barrancas within a few hundred yards of the town. Volcanic cinders are also quarried out of the sides of barrancas, often within the town, and are employed to spread over slippery places on trails, streets, and yards. The supply of materials far exceeds demand, and the public domain affords all needed supplies.

Most of the rock used in Cherán comes from a quarry on the west face of the hill of Santa Karákua (also called Santiákujákua) within the village. Most of the rock is prised out of the upper face of the quarry in large pieces, which usually are broken up in the fall to the foot of the quarry. The broken rock is then placed in piles, which later comers will not molest. Smaller rocks and spalls are abundant and anyone may help himself to these. The rocks are usually packed by tying them on burros with ropes, while small pieces may be placed in nets or in pack boxes.

Clay is somewhat more scarce. It is used only for tilemaking and brickmaking, as no one in Cherán makes pottery. A sufficient supply of clay for all present needs is dug out

[5] At Sopoco in La Cañada, Rendón was told that the larvae are sometimes eaten raw.

339 In some towns, dried pine needles (*"huinomo"*), wheat, or oat straw are used in place of manure.
[192] In the Sierra, adobes are called adóbi; in Ihuatzio, on Lake Pátzcuaro, isuárukata.

STONE

316 Masonry is made of assorted-sized rocks brought
333 from a quarry in the west side of the cinder cone on the northwest edge of town. The stone is a porous soft reddish lava, easily broken or dressed roughly with a hammer. It is carried from the
[497] quarry on burros. The rocks are used for all types of masonry walls. Usually large sizes are employed near the bottom and to make the external faces of the wall; smaller stones are used to fill up the spaces, and usually all external surfaces are filled with small stone spalls set in the mud mortar.

316 Large stones used for foundations are a hard gray lava from the arroyo north of town or from the slopes of a cinder cone northeast of town.
[324] The same rock is employed for finished pieces of

[continued on p. 10b]

TYPES OF STRUCTURES
WOODEN STRUCTURES

343 Three main kinds of wooden structures are built. These are the *"troje,"* or house (trója; in Angahuan, ꞌarímba), really a storehouse in use, the kitchen (kosína), and sheds used for storing fodder or sheltering animals. Normally, a
[335] master carpenter is employed; he usually works for an agreed price and hires a helper.

The *"troje"* is a rectangular structure, nearly square, consisting of one room with a loft over it (fig. 3; pl. 2, upper). The door is always in one of the long walls and there is usually an overhang of the roof, supported on pillars, forming a veranda on this side. Usually the flooring of the first floor is extended to form a floor for the veranda (fig. 3; pl. 4, lower, left).

343 The *"troje,"* or house, is elevated on large stones
335 (or stone pillars in some towns), usually 9 in number, one at each corner, one in the middle of each side, and one at the center of the floor. Upon the stones go four interlocking foundation beams, *"polines"* [3] (píɕekua), and a crosspiece destined to support the middle of the floor, the *"atravesaño de*

[continued bottom page 10b]

[3] Also "parines," because they are usually made of heartwood (ꞌaxíɲ).

342 masonry is used to complete a wall; in others,
333 the upper part of the wall is completed in adobe brick. In the latter case, the stonework wall is carried up at least half a meter (20 in.) above ground level.

Masonry is always extended about 50 cm. (20 in.) below the ground surface, whether used only as a foundation or for the complete wall. The
[316] stone used is the volcanic tufa brought from a nearby cinder cone The walls are usually about 50 cm. (20 in.) in thickness. Larger stones are set with relatively flat faces outward. The flat faces will be dressed if this is imperative but no other shaping is done. To fill in irregular spaces in the wall face, stones of proper shape with one flat face are sought in the pile of materials. Small stone spalls are also employed abundantly to fill in any spaces between rocks. The mortar is of adobe mud mixed with animal dung, and the central part of the wall is filled in with irregular rocks and considerable quantities of mortar.

If the upper part of the wall is to be of adobe bricks, these also are laid in adobe mortar (fig. 13). Two sizes of brick are employed; the larger size results in a somewhat thicker wall. The mortar is the same as that employed for masonry. In the Sierra and on those islands in Lake Pátzcuaro where adobes are not made, the stone base is usually higher than elsewhere.

In construction, a professional mason is employed. He erects a frame to which strings are attached to keep the wall straight. He also uses a plumb line to keep the wall vertical. A trowel

4: West K-5 (1946) 1948 NU34 Tarasco NU34
[P. 69-b]

282 in the Tarascan area.[183] By the latter part of the
438 19th century leathercrafts began to decline, and today within the Tarascan area only Nahuatzen (largely mestizo) continues to tan hides and make saddles and other riding equipment.[184] Some Tarascan towns now boast of one or two *zapateros* who make huaraches of imported leather for local consumption. The principal huarache-making centers are now the surrounding mestizo towns: Coeneo, Zacapu, Tinguindín, Los Reyes, Uruapan, Ario de Rosales.

METALCRAFT

325 **Copper work.**—The Tarascans were probably the foremost metallurgists in pre-Columbian Mexico. They worked gold, silver, and copper. The precious metals were formed into ornaments and disks, which were *caltzontzin* stored on the islands in Lake Pátzcuaro; useful objects, such as axes, *coas*, and spearheads, were made of copper (Relación de Michoacán, pp. 104–109, 122–123). Although definite archeological evi-
325 dence is not yet at hand, it is probable that the
172 Tarascans purified native copper and extracted metal from simple oxide ores by smelting (Hendrichs, 1940, p. 327).[185] From cursory inspection of copper artifacts extant in the Museo Regional Michoacano, Morelia, it appears that Tarascans cast copper objects (axheads) in stone molds. After casting, the axes seem to have been further shaped and possibly hardened by hammering.[186] Accidental, rather than deliberate, alloying with tin and zinc probably occurred.

325 The Tepalcatepec and Balsas Basins contained
316 the ancient copper mines and metallurgical sites.
172 Hendrichs (1940, 1945–46) has described several probable ancient copper mines sites in both the

[183] AGN Tierras, vol. 82, exped. 13; Zavala and Castillo, 1939–42, vol. 7, pp. 361–362; AGN Historia, vol. 73, ff. 178–178. The present northern Tarascan towns of Zipiajo, Asajo, Companjo, Tatajaro, Tiridaro, Naranja, and Turumendo were all producers of shoes and saddles in the latter part of the 18th and in the 19th century.

[184] Beals (1945, p. 44) states that in 1940 one person from Aranza was tanning hides in Cherán. The old men of Cocucho remember the manufacture of the black "*zapatos de raquetas*" in their town during the last century. These were sold throughout the Sierra as well as in surrounding mestizo towns.

[185] The Lienzo de Jucutacato, a 16th-century representation of the migration of a people from the Gulf of Mexico into the Tarascan country (where they learned metallurgy) clearly depicts smelting of ore or metal (probably copper) apparently with the aid of charcoal and forced air draft (blowpipes) at the ancient copper center of Jiuhkin (Jiuhkin Viejo), 20 km. south of Uruapan.

[186] Microanalysis of Tarascan copperware has not yet been undertaken. Until the results of such analyses are known, it is impossible to make definite statements as to ancient metallurgical methods. Interestingly, the flange shape of the modern Tarascan steel axhead is identical with that of the copper axes found in archeological sites in the Balsas Basin.

325 southern and northern drainages of the lower
172 Balsas (Guerrero). However, the mines of
Inguarán in the northern drainage of the lower
● 316 Balsas in Michoacán were the main source of the
metal. Smaller deposits, such as those of Sinagua,
were gophered over a wide area. The villages
[438] of La Huacana, Jicalán, Sinagua, and possibly
Tzatzio appear to have been the chief pre-Columbian copper refining centers.[157]

325 Needing copper for the manufacture of brass
438 cannon, the Spaniards quickly levied tribute in
copper bars on various pueblos in the Balsas and
Tepalcatepec Basins. Later, adventurers (in the
name of the Crown) took over the native mines
[177] at Inguarán, probably introducing European
smelting techniques. The main 16th-century
Spanish smelting and refining center was Tzatzio,
10 miles each of Ario. This center was located
within pine and oak forests, which afforded raw
materials for charcoal, and was near the chief
highway from Pátzcuaro to the *tierra caliente*.
Copper ore and probably native copper was carried by Indians to Tzatzio from the Inguarán
mines, which lay 15 miles to the south (AGN
General de Parte, vol. 5, ff. 311–313, 1601).
Tzatzio was probably an ancient copper center,
and the experienced Tarascan metallurgists were
retained by the Spaniards to continue with European methods. Before the end of the 16th century
the Spanish Crown had established an *asiento*
in the Michoacán copper industry, in order to
insure a steady supply of metal for the foundaries in Mexico City.[158] Between 1607 and 1614

---

[157] The Suma de Visitas, ca. 1540, state that the Spaniards exacted tribute of copper bars from La Huacana and Jicalán (Paso y Troncoso, 1905, vol. 1, pp. 123, 294). Moreover, every 20 days 20 Indians of Coyuca carried copper bars to Mexico (ibid., p. 80). Coyuca, located near the confluence of the Balsas and Cutzamala Rivers, may have been a collecting point for small lots of copper refined in various pueblos of the middle Balsas drainage. At the end of the 16th century copper was still being mined, refined, and made into tools at Sinagua (Mus. Nac., leg. 102, Rel. de Cinguacingo). Tzatzio was one of the first Spanish copper smelting centers in the area, and was probably an old Tarascan center as well (AGI And. de México, leg. 256). In passing, it should be noted that the old La Huacana was located near the Inguarán mines. In 1759 the town was destroyed by the eruption of Jorullo, and a new settlement, the La Huacana seen on modern maps, was established near Tamacuaro 15 miles west of the old site (AGN Historia, vol. 73, ff. 302-304)

[158] Under the *asiento*, or contract, system, control of various industries was farmed out to private individuals. In the case of the copper industry of Michoacán, administrative control was purchased from the Crown for 6-year periods. The administrator was obliged to furnish the Government a stipulated amount of copper annually at a fixed price. In 1599 an official survey was made of the copper industry in Michoacán. The surveyor recommended that owing to forest depletion around Tzatzio and the consequent difficulty in charcoal supply, refining operations should be moved to Ario, near abundant pine forests (AGI And. de Mexico, leg. 256). It is doubtful that this move was made, since in 1607 copper was still being refined at Tzatzio (Zavala and Castello, 1939–46, vol. 6, p. 165).